Trend Study 27-10-03

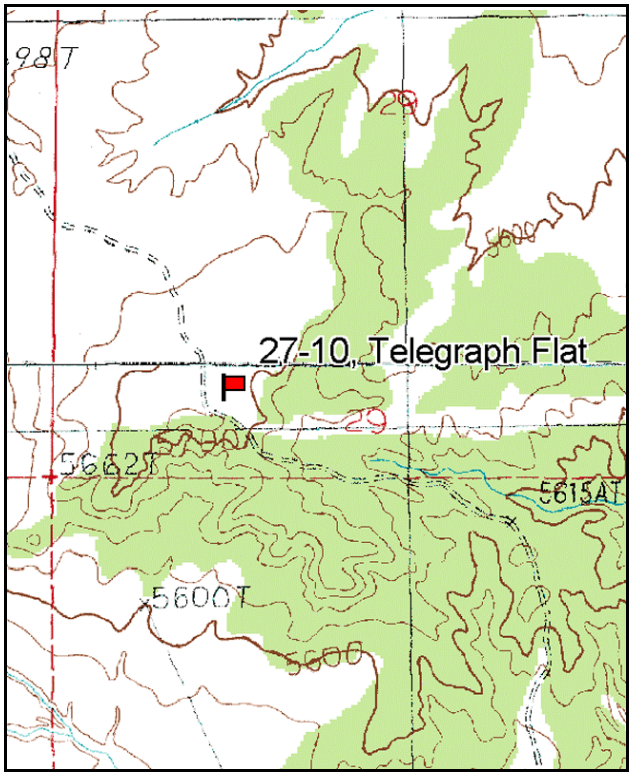
Study site name: Telegraph Flat . Vegetation type: Cliffrose, Pinyon-Juniper .

Compass bearing: frequency baseline 358 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

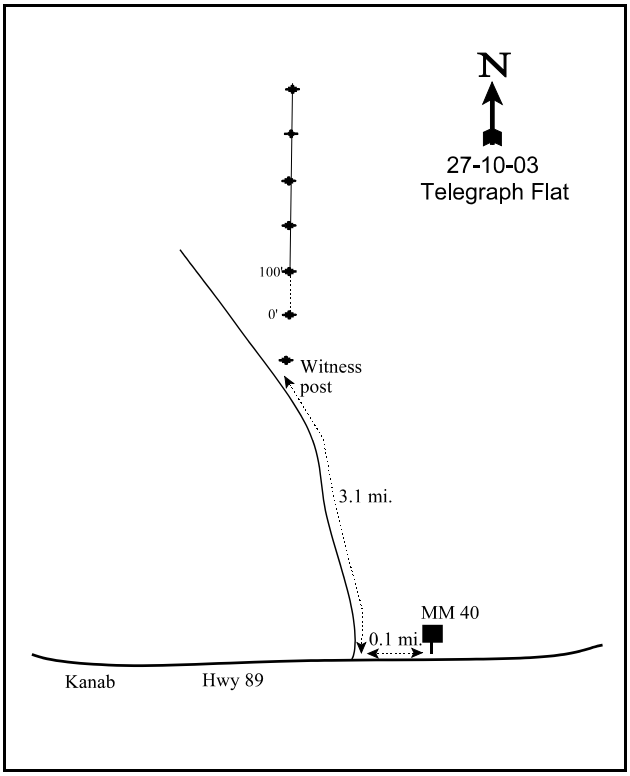
LOCATION DESCRIPTION

From mile marker #40 on Highway 89 east of Kanab, go 0.1 mile west to a road on the north. Go north 2.7 miles to a witness post on the right side of the road. From the witness post walk 14 paces at 0 degrees magnetic to the 0' stake. The study runs north and is marked by green, steel fenceposts approximately 12-18 inches in height.



Map name: Telegraph Flat

Township 42S , Range 3W , Section 29



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4109067 N, 397554 N

DISCUSSION

Telegraph Flat - Trend Study No. 27-10

This study was established in 1997 and is located east of Telegraph Wash and west of Clay Hole Wash. The site samples a Wyoming big sagebrush community with a cliffrose and pinyon/juniper overstory on a nearly level bench. This area was chained and seeded in 1963. Elevation is approximately 5,700 feet. Pellet group transect data collected in 2003 estimated 28 deer and 17 cow days use/acre (69 ddu/ha and 41 cdu/ha) on the site. A few elk pellets were found in the quadrat sampling in 1997, and rabbit pellets were moderately abundant in 1997 and 2003.

Soil on the site has a sandy loam texture with a neutral pH (7.2). Soil depth is moderate with an effective rooting depth estimated at over 14 inches. There is no rock and little pavement on the surface or in the profile. Soil temperature was moderately high averaging 60°F at an average depth of 16 inches in 1997. There was a considerable amount of bare ground exposed in both 1997 and 2003 (nearly 50%), but erosion is minimal on the site due to the lack of significant slope and the high infiltration rate of the sandy soils. There are numerous gullies near the site which have been caused by high intensity summer storms. An erosion condition class assessment completed in 2003 resulted in a stable soils rating on the immediate site.

The key browse species is Wyoming big sagebrush which accounted for 2/3 of the total browse cover in 1997 and 2003. Population density was estimated at 12,760 plants/acre in 1997, declining to 8,340 plants/acre in 2003. Half of the population consisted of young plants in 1997 with the remainder being mostly mature. In 2003, young plants accounted for a very small portion of the total population (1%), and decadence increased from 10% to 42%. Nearly half of the decadent age class in 2003 was classified as dying which translates into ~1,700 plants/acre that could die-off in the near future. With drought conditions prior to and including the 2003 survey, it appears that this highly dense sagebrush population is in a period of thinning, but should stabilize at a lower density level once precipitation patterns return to normal. Two-thirds of the sagebrush showed moderate or heavy use in 1997, declining to 43% in 2003. Twenty-one percent of the population displayed poor vigor in 2003, an increase from only 4% in 1997. Annual sagebrush leaders had averaged 1.7 inches of annual growth when the site was read in early August 2003.

Cliffrose density was estimated at 400 plants/acre in 1997 and 320 in 2003. Mature plants are large averaging nearly 5 feet in height, resulting in a portion of the cliffrose forage being unavailable to browsing. As with Wyoming big sagebrush, young cliffrose were abundant in 1997, accounting for 55% of the population. The proportion of young plants declined to a more moderate level of 25% in 2003. Utilization on cliffrose was moderate to heavy in both 1997 and 2003, but vigor was normal in both surveys and decadence low at 5% and 19% respectively. Cliffrose leaders averaged 3.8 inches of growth in August 2003. Pinyon and juniper had a combined density of 64 trees/acre on the site in 2003.

The herbaceous understory is poor. Five perennial and 2 annual grass species were sampled on the site in 1997. Crested wheatgrass was the only common species as it provided 90% of the herbaceous cover and was sampled in 83% of the quadrats. In 2003, crested wheatgrass was not sampled at all. The only plausible explanation is that crested wheatgrass was “droughted out”, which was surprising to project personnel as this species is typically thought of as drought tolerant. Forbs were rare in both surveys and provide very little to the site.

1997 APPARENT TREND ASSESSMENT

A considerable amount of bare soil is exposed on the site (50%) with some soil pedestalling evident. Herbaceous cover is lacking and nearly 3/4 of the vegetative cover consists of shrub crowns. However, due to the gentle terrain, erosion is not currently a serious problem on the site. The key browse, Wyoming big

sagebrush, displays a dynamic population with half of the plants being young. Mature plants are quite dense at an estimated 5,060 plants/acre. Utilization is moderate to heavy but vigor is good and decadence relatively low at 10%. There are some indications that the population may start to decline in numbers in the future. Cliffrose are moderately hedged with good recruitment, normal vigor, and low percent decadence. This population appears stable. The herbaceous understory is lacking. The only fairly common species is crested wheatgrass which makes up 90% of the herbaceous cover.

2003 TREND ASSESSMENT

Trend for soil is stable but poor. Bare ground remains high at nearly 50%, but erosion is minimal on the immediate site. Vegetation and litter cover remain similar to 1997 estimates. Several gullies are present in the vicinity which are caused by high intensity thunderstorms. Trend for browse is down. Wyoming big sagebrush showed a drastic decline in total density as the number of young decreased from 50% of the population to only 1%. Percent decadence increased from 10% to 42%, and nearly half of the decadent age class was classified as dying which equates to ~1,700 plants/acre that could be lost from the population in the near future. This dense population appears to be in a period of thinning due to the current drought cycle as well as high intraspecific competition between plants. Cliffrose remains healthy overall with a nearly stable density, good vigor, and low decadence. Trend for the herbaceous understory is down. Crested wheatgrass was the only abundant herbaceous species in 1997, but was not sampled on the site in 2003. The only plausible explanation is that crested wheatgrass was "droughted out". Cattle grazing may also be a factor but cow use was not very high in either sampling year and overgrazing is unlikely. Rabbit pellets were moderately abundant on the site in both 1997 and 2003 and use by rabbits may also be a cause for the decline. Crested wheatgrass is typically quite drought and grazing tolerant and it's absence from the site in 2003 was surprising. This trend has been seen in other areas of the region where crested wheatgrass has been seeded on sandy soils and declined significantly during drought.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Management unit 27 , Study no: 10

Type	Species	Nested Frequency '97	Nested Frequency '03	Average Cover % '97	Average Cover % '03
G	Agropyron cristatum	[b]252	[a]-	5.83	-
G	Aristida purpurea	[a]8	[b]21	.20	.24
G	Bromus tectorum (a)	2	-	.00	-
G	Festuca ovina	8	-	.01	-
G	Oryzopsis hymenoides	8	6	.06	.03
G	Sitanion hystrix	3	6	.03	.01
G	Vulpia octoflora (a)	10	-	.04	-
Total for Annual Grasses		12	0	0.05	0
Total for Perennial Grasses		279	33	6.15	0.29
Total for Grasses		291	33	6.20	0.29

Type	Species	Nested Frequency		Average Cover %	
		'97	'03	'97	'03
F	Agoseris glauca	1	-	.00	-
F	Astragalus spp.	5	-	.03	-
F	Calochortus nuttallii	-	3	.00	.01
F	Castilleja spp.	1	-	.00	-
F	Eriogonum umbellatum	-	1	-	.00
F	Gilia spp. (a)	$_{a}$2	$_{b}$29	.00	1.01
F	Holosteum umbellatum (a)	3	-	.00	-
F	Machaeranthera canescens	-	1	-	.00
F	Microsteris gracilis (a)	3	-	.00	-
F	Navarretia intertexta (a)	$_{a}$-	$_{b}$89	-	2.49
F	Phlox austromontana	3	7	.15	.06
F	Phlox hoodii	5	-	.03	-
F	Sphaeralcea grossulariaefolia	-	1	-	.00
F	Stephanomeria exigua (a)	-	2	-	.03
F	Unknown forb-annual (a)	3	-	.03	-
Total for Annual Forbs		11	120	0.04	3.53
Total for Perennial Forbs		15	13	0.23	0.08
Total for Forbs		26	133	0.28	3.62

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 27 , Study no: 10

Type	Species	Strip Frequency		Average Cover %	
		'97	'03	'97	'03
B	Amelanchier utahensis	0	0	.03	-
B	Artemisia tridentata wyomingensis	85	89	11.60	13.33
B	Chrysothamnus nauseosus	1	0	-	-
B	Cowania mexicana stansburiana	15	14	1.90	2.35
B	Ephedra viridis	0	1	-	-
B	Gutierrezia sarothrae	3	8	-	.19
B	Juniperus osteosperma	4	3	1.26	2.00
B	Pinus edulis	2	2	1.66	2.62
B	Yucca spp.	0	0	.38	-
Total for Browse		110	117	16.84	20.52

CANOPY COVER, LINE INTERCEPT --
Management unit 27 , Study no: 10

Species	Percent Cover	
	'97	'03
Artemisia tridentata wyomingensis	-	13.56
Cowania mexicana stansburiana	2.20	3.90
Juniperus osteosperma	3.59	2.59
Pinus edulis	1.79	4.00

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 27 , Study no: 10

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	1.7
Cowania mexicana stansburiana	3.8

POINT-QUARTER TREE DATA --
Management unit 27 , Study no: 10

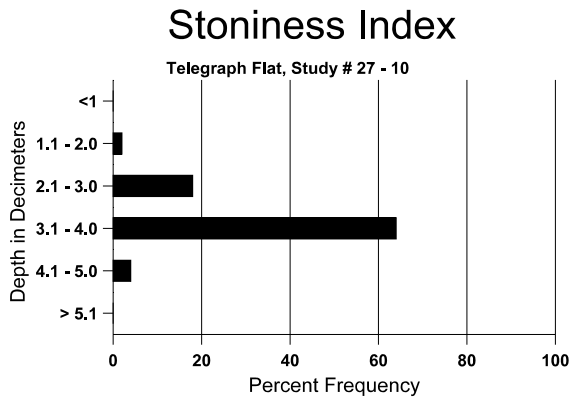
Species	Trees per Acre	Average diameter (in)
	'03	'03
Juniperus osteosperma	36	2.7
Pinus edulis	28	5.4

BASIC COVER --
Management unit 27 , Study no: 10

Cover Type	Average Cover %	
	'97	'03
Vegetation	22.68	24.62
Pavement	.06	.05
Litter	28.17	34.32
Cryptogams	4.69	6.74
Bare Ground	49.65	48.52

SOIL ANALYSIS DATA --
Management unit 27, Study no: 10, Study Name: Telegraph Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.4	73.3 (13.9)	7.2	62.4	19.1	18.6	1.3	20.2	124.8	0.6



PELLET GROUP DATA --
Management unit 27 , Study no: 10

Type	Quadrat Frequency '97	Quadrat Frequency '03	Days use per acre (ha) '03
Sheep	1	-	-
Rabbit	18	19	-
Elk	3	-	-
Deer	19	24	28 (69)
Cattle	-	7	17 (41)

BROWSE CHARACTERISTICS --
Management unit 27 , Study no: 10

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
97	**12760**	140	6400	5060	1300	180	55	12	10	4	20/31
03	**8340**	-	80	4740	3520	520	13	30	42	21	17/23
Chrysothamnus nauseosus											
97	**80**	-	80	-	-	-	100	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Cowania mexicana stansburiana											
97	**400**	-	220	160	20	20	60	0	5	0	59/68
03	**320**	-	80	180	60	80	13	69	19	0	54/66
Ephedra viridis											
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	22/16
Gutierrezia sarothrae											
97	**100**	-	-	80	20	-	0	0	20	0	9/10
03	**280**	-	20	260	-	40	0	0	0	0	9/12
Juniperus osteosperma											
97	**80**	-	20	60	-	40	0	0	-	0	-/-
03	**60**	-	-	60	-	-	0	0	-	0	-/-
Opuntia spp.											
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	4/9
Pinus edulis											
97	**40**	-	-	40	-	-	0	0	-	0	-/-
03	**40**	-	-	40	-	-	0	0	-	0	-/-
Yucca spp.											
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	19/24